

EXHIBIT 4

Making Assessments About Materiality Less Subjective Through The Use of Content Analysis

David Tabak*



Introduction

One of the elements of a securities fraud claim is “a material misrepresentation (or omission).”¹ If, in fact, there was a misrepresentation, it must be established that the misrepresentation was material. There have been two common methods by which experts in such actions have reached opinions about the materiality of new information provided to the market: (1) a subjective assessment of the relevant information, in which the expert’s conclusion is often based on the general knowledge and experience of the expert, and (2) a statistical analysis of the movements in the price of a security when the misrepresentation or a correction of the misrepresentation is revealed to the market, a technique known as an “event study.” Over the years, many courts in shareholder class actions have required that an expert’s analysis of the effect of information be in the form of an event study or a similar analysis where possible.² In part, this may be due to courts’ recognition that even when acting in good faith, an expert’s subjective view as to the materiality, and certainly the magnitude of the effect, of information can be unreliable. While recognizing that the event study methodology has become the gold standard (to the point where one court declared, “The Expert Witness’ failure to conduct a thorough ‘event study’ would be reason enough to exclude his proposed testimony”³) for those occasions where it can be employed, we seek to shed light on a different technique—quantitative content analysis—that can be helpful as a supplement to or a substitute for an event study for those cases where an event study is not sufficient or even possible.

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¹ *Dura Pharmaceuticals, Inc. v. Broudo*, 125 S. Ct. 1627.

² See, for example, *In re Imperial Credit Industries, Inc. Securities Litigation*, 252 F. Supp. 2d 1005, 1014 (C.D. Cal. 2003) *aff’d sub nom. Mortensen v. Snavelly*, 145 Fed. Appx. 218 (9th Cir. 2005). (“Because of the need ‘to distinguish between the fraud-related and non-fraud related influences on the stock’s price behavior,’ *In re Oracle Sec. Litig.*, 829 F.Supp. 1176, 1181 (N.D.Cal.1993), a number of courts have rejected or refused to admit into evidence damages reports or testimony by damages experts in securities cases which fail to include event studies or something similar.”)

³ *In re Executive Telecard* 979 F.Supp 1021 (SDNY 1997) at 1027.

Materiality as an Element of Litigation

Despite the requirement that a misrepresentation or omission be material in securities fraud and broker/customer cases, the definition of what is material is somewhat elusive. In *Basic v. Levinson*, 485 U.S. 224 (1988) 485 U.S. 224, the Supreme Court relied on a prior holding, noting:

The Court also explicitly has defined a standard of materiality under the securities laws, see *TSC Industries, Inc. v. Northway, Inc.*, 426 U.S. 438 (1976), concluding in the proxy-solicitation context that “[a]n omitted fact is material if there is a substantial likelihood that a reasonable shareholder would consider it important in deciding how to vote.” *Id.*, at 449.... It further explained that to fulfill the materiality requirement “there must be a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the ‘total mix’ of information made available.” *Id.*, at 449. We now expressly adopt the TSC Industries standard of materiality for the 10(b) and Rule 10b-5 context.

Thus, roughly speaking, one can say that a statement is material when it would be “important” and when it “alters the total mix of information.” But determining whether a statement meets those criteria has been, and remains, difficult. The Committee on Capital Markets argued in its November 30, 2006 Interim Report (“Interim Report”) that there needs to be “greater clarity to private litigation under Rule 10b-5, as regards the definition of materiality and other matters. Needless uncertainty will drive participants to competitor market centers.”⁴ The Interim Report further noted that the “Circuit Courts of Appeals have issued conflicting opinions on a number of Rule 10b-5 issues. On materiality, the Third and Ninth Circuits are split in their willingness to consider a disclosed misrepresentation as ‘immaterial’ as a matter of law if it does not produce any effects on the market. The Ninth Circuit has held that a misrepresentation may be material even if the market has failed to react to it, and that such a determination is not purely a matter of law but requires a fact-specific inquiry. The Third Circuit, on the other hand, has held that a court can deem a misrepresentation to be immaterial as a matter of law if the misrepresentation fails to affect the market.”⁵

In particular, the Ninth Circuit ruled in *No. 84 Employer-Teamster Joint Council Pension Trust Fund v. Am. W. Holding Corp.*, 320 F.3d 920, 934 (9th Cir. 2003):

The District Court found that the alleged omissions and misrepresentations regarding America West’s maintenance issues, the FAA investigation, and the FAA settlement agreement were immaterial as a matter of law because the market did not immediately react, either after the June 23, 1998 Wall Street Journal disclosure of the potential FAA fines or after the July 14, 1998 announcement that the FAA had levied a \$5 million fine. In doing so, the District Court applied the bright line rule suggested by the Third Circuit in *Oran v. Stafford*, 226 F.3d 275 (3d Cir.2000). *Id.* at 282 (finding that misrepresentations or omissions are immaterial as a matter of law if the market does not react immediately upon disclosure of the information).

Defendants urge us to adopt this per se rule, i.e., if there has been no immediate change in the stock price, the alleged misrepresentations or omissions must have been immaterial. However, we decline to do so because adoption of such a rule would

⁴ Interim Report, p. xii.

⁵ Interim Report, pp. 80–81. Internal citations omitted.

contravene the Supreme Court's holdings in *Basic, Inc. v. Levinson*, 485 U.S. 224, 108 S.Ct. 978, 99 L.Ed.2d 194 (1988) and *TSC Industries, Inc. v. Northway, Inc.*, 426 U.S. 438, 96 S.Ct. 2126, 48 L.Ed.2d 757 (1976)."⁶

In *Oran v. Stafford*, 226 F.3d 275, 282 (3d Cir. 2000), the Third Circuit in fact reaffirmed a prior ruling on materiality:

In *Burlington*, however, this Court fashioned a special rule for measuring materiality in the context of an efficient securities market. This rule was shaped by the basic economic insight that in an open and developed securities market like the New York Stock Exchange, the price of a company's stock is determined by all available material information regarding the company and its business. In such an efficient market, "information important to reasonable investors... is immediately incorporated into the stock price." *Burlington*, 114 F.3d at 1425. As a result, when a stock is traded in an efficient market, the materiality of disclosed information may be measured post hoc by looking to the movement, in the period immediately following disclosure, of the price of the firm's stock. Because in an efficient market "the concept of materiality translates into information that alters the price of the firm's stock," if a company's disclosure of information has no effect on stock prices, "it follows that the information disclosed... was immaterial as a matter of law." *Burlington*, 114 F.3d at 1425.

Thus, as noted in the Interim Report, there is no uniformity on what would be evidence of materiality. Given this lack of uniformity, it is not surprising that there have been two general methods for assessing materiality, one that relates to the measurement of stock price movements, and the other that is potentially flexible enough to handle any definition.

Assessing Materiality Via Stock Price Movements

The most common analysis used by financial economists to quantify the effects of information on the price of a security is called an "event study." The event study technique has been used by academics since 1969 and is often applied in the academic literature to cases involving claims of securities fraud.⁷

⁶ Interestingly, the majority's reasoning for this was as follows: "The market is subject to distortions that prevent the ideal of 'a free and open public market' from occurring. 485 U.S. at 246, 108 S.Ct. 978 (internal quotation marks and citation omitted). As recognized by the Supreme Court, these distortions may not be corrected immediately. See *id.* at 248 n. 28, 108 S.Ct. 978. Because of these distortions, adoption of a bright-line rule assuming that the stock price will instantly react would fail to address the realities of the market. Thus, we decline to adopt a bright-line rule, and, instead, engage in the 'fact-specific inquiry' set forth in *Basic*." (Internal footnote omitted.) The dissent at 949 made the following well-reasoned reply: "In light of these allegations, which we must construe as true for purposes of a motion to dismiss, I am at a loss to understand what evidence the majority employs to discount the non-reaction of the market because the 'market is subject to distortions.' What distortions? The plaintiffs have not alleged any, and in fact have alleged the opposite in order to invoke the fraud-on-the-market theory. A vital premise to the fraud-on-the-market theory is the efficient nature of the marketplace. While surely a plaintiff in some other case might allege facts that would show distortions in the market preventing the efficient dissemination of information to investors, and thus lessen the significance of any consistency, or inconsistency, in stock price, the plaintiffs here have not. In fact, even the majority's invocation of a quote from *Basic* regarding a 'free and open public market' stands for *exactly the opposite* proposition for which the majority quotes it. See 485 U.S. at 245–46, 108 S.Ct. 978." (Emphasis in original.)

⁷ See, for example, Fischel, Daniel R., "Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities," *The Business Lawyer*, Vol. 38, November 1982, pp. 1–20; Macey, Jonathan R., Geoffrey P. Miller, Mark L. Mitchell, and Jeffrey M. Netter, "Lessons from Financial Economics: Materiality, Reliance, and Extending the Reach of *Basic v. Levinson*," *Virginia Law Review*, Vol. 77, August 1991, pp. 1021–28; MacKinlay, A. Craig, "Event Studies in Economics and Finance," *Journal of Economic Literature*, Vol. 35, March 1997, pp. 13–39; Mitchell, Mark L. and Jeffrey M. Netter, "The Role of Financial Economics in Securities Fraud Cases, Applications at the Securities and

The technique employed in an event study is similar to a medical experiment in which there is a “control group” and a “treatment group.” The control group provides a benchmark against which the treatment group is compared to determine if the event being studied had any effect. In a securities setting, the control group is established by modeling the normal relationship of a stock’s price movements to movements of a market and/or industry index. The difference between the stock price movement we actually observe and the movement we expected to observe (*i.e.*, the difference between the treatment and control group) that occurs upon the release of a particular piece of information is called the excess price movement of the stock at the time of the event. This excess price movement is tested for statistical significance to see whether the result is unusual or is likely to be explained by the normal random variations of the stock price.

Many courts have found an event study to be a scientifically objective form of analysis and further held that an event study, or similar form of analysis, is necessary for proof of damages in a securities fraud claim.⁸ Event studies have been used by plaintiffs to establish loss causation⁹ and by defendants to defeat reliance¹⁰ and loss causation.¹¹ Put simply, event studies are the standard by which most expert analysis of damages and loss causation proceeds in securities fraud cases today.

It should be noted that there are at least two instances where event studies are either unhelpful or insufficient. First, a meaningful event study cannot be performed on the date of an omission or on a date where nothing was announced. Second, the basic event study as described in the academic literature measures the combined effect on a stock’s price of all the news that entered the market during the measurement period; additional steps are necessary if one is to isolate the effect of a particular statement in the news.¹² To deal with these issues, experts have often performed indirect

Exchange Commission,” *The Business Lawyer*, Vol. 49, February 1994, pp. 545–590; and Tabak, David I. and Frederick C. Dunbar, “Materiality and Magnitude: Event Studies in the Courtroom,” in *Litigation Services Handbook: The Role of the Financial Expert* 3rd Edition, (2001).

⁸ See, for example, *In re Executive Telecard, Ltd. Securities Litigation*, 979 F. Supp. 1021, 1997 WL 643722 (S.D.N.Y.) (“The Expert Witness’ failure to conduct a thorough ‘event study’ would be reason enough to exclude his proposed testimony.”) and *In re Imperial Credit Industries, Inc. Securities Litigation*, 2003 WL 1563084 (C.D. Cal.).

⁹ See, for example, *In re Gaming Lottery Sec. Litig.*, No. 96 Civ. 5567 (RPP), 2001 U.S. Dist LEXIS 2034, at *18 (S.D.N.Y. Mar. 1, 2001) (“Additionally, Class Plaintiffs’ damages expert has opined that based upon the event study that he performed, Defendants’ public statements subsequent to May 3, 1995, and during the period of concealment of its non-licensed operation of Specialty Manufacturing, concerning Gaming Lottery’s earnings and planned acquisitions of gaming companies and supply contracts with state lotteries ‘caused [Gaming Lottery’s] stock price to increase from the \$3.00 to \$4.00 trading range early in 1995 to approximately \$8.00 per share by the Fall of 1995.’ [Plaintiffs’ damages expert] concluded that ‘disclosing the failure to obtain regulatory approval, termination of these acquisitions, and Gaming Lottery’s consequential exit from the gaming industry caused the stock price to decline significantly from December 1995 through May 1996.’ (*Id.* at 12, ¶ 30.) No reasonable juror could find that a genuine issue of material fact exists regarding loss causation under Section 10(b) of the Securities Exchange Act or Rule 10b-5 promulgated thereunder. Accordingly, Class Plaintiffs’ motion for summary judgment on their claims under Section 10(b) of the Securities Exchange Act and Rule 10b-5 promulgated thereunder for the period of May 3, 1995, through May 24, 1996, is granted.”)

¹⁰ *Zonagen, Inc. Securities Litig.*, 322 F. Supp. 2d 764 (S.D. Tex. 2003) (“Defendants’ expert, Frederick Dunbar, explains that he conducted an event study; a statistical method of measuring the effect of an event on a stock price... and concluded that none of these public statements caused a statistically significant increase in Zonagen’s stock price.... Defendants have thus rebutted the resumption of reliance by making an uncontradicted showing that the market was not affected by the allegedly culpable statements.”) (Internal footnote omitted.)

¹¹ *Goldkrantz v. Griffin* 1999 WL 191540 (SDNY) *5 (S.D.N.Y. April 6, 1999), *aff’d* 201 F.3d 431 (2d Cir. 1999) (“Any doubt, however, is resolved by the failure of plaintiff to contest that the defendants’ Event Study Analysis reliably isolates firm specific price changes and that none of the statistically significant changes are explainable by the release of information related to [the allegations].”)

¹² Much of the legal literature treats the term “event study” as including not just the standard academic analysis of price movements but also of separating out, or parsing, the effects of different events that occurred in the same measurement window.

tests (such as looking at a date when omitted information was later revealed) or additional analyses (such as separating out the effects of different pieces of information in the same news release). The weight that one should assign to these alternative or supplemental analyses then depends on the degree with which they resolve the difficulties they are designed to address.

Assessing Materiality Through Subjective Analysis

The second common means by which experts attempt to argue that information was or was not material is by a subjective analysis relying on their experience and background. Attempts to introduce such expert testimony have met with mixed degrees of success. For example, in *Howard Miller v. Thane International, et al.* (C.D. Cal 2005) Case No. SACV 03-1031-JVS(SGLx), the court allowed an expert to testify to materiality based on her professional experience, but specifically did not allow the expert to use that analysis as a means for measuring damages:¹³

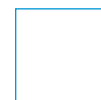
The Court also finds that the first portion of [the expert's] report, in which she deals with issues of materiality and whether investors were misled are reliable and relevant. The Court disagrees with Thane's assertion that [the expert's] review of the Proxy Statement/Prospectus could have just as easily been done by this Court. Here, [the expert] did not merely review the Proxy Statement/Prospectus to determine exactly what information it contained. Rather, [the expert] used her experience as a financial analyst to opine on the reason why Thane included certain statements in the Proxy Statement/Prospectus and the importance of this document to investors...

The Court, therefore, finds [the expert's] opinions on materiality and whether investors were misled to be reliable, as based on her professional experience, and relevant because they will assist the trier of fact.... The Court, however, notes that these opinions are not a substitute for damage computation that factor out other events that may have contributed to the decline in Thane's share price.

In other instances, subjective testimony on materiality was not allowed. For example, in *Hill v. Equitable Bank*, 1987 WL 8953 at *1 (D. Del 1987), the court ruled, "Plaintiffs propose to have [a law professor] testify as to whether defendant's alleged omissions and misrepresentations were 'material.' Defendant claims that such testimony runs afoul of Federal Rules of Evidence 702 and 704. Defendant's motion will be granted." (Internal footnote omitted.) The court explained, "The question of materiality depends in large part upon the reasonable man standard. Determining what effect a particular fact would have upon the action of a reasonable man is, in all areas of the law, an area of inquiry typically belonging to the finder of fact."

In at least one case, plaintiffs argued that an event study would not be helpful because the case involved an omission of information. Plaintiffs instead argued that the court should accept the

¹³(Internal citations omitted from the quote.) Note that the expert was not allowed to testify about damages because she did not parse out the effects of confounding information. The expert claimed to have accounted for other information through a technique she termed an "event analysis," though we have found no academic literature describing such a technique. Interestingly, years earlier, a different court allowed this same expert to use an "event analysis" as a means of measuring damages. It is not clear whether the different rulings on admissibility were due to different perspectives by different courts or due to the judicial movement toward requiring more rigorous analyses between the two cases. It also appears that the "event analysis" allowed the expert, working for plaintiffs in both cases, to conclude that all of the price movements not accounted for by the market were due to the alleged frauds. See, e.g., *RMED International, Inc. v. Sloan's Supermarkets, Inc.*, Fed. Sec. L. Rep. 90,926, 2000 WL 310352 (S.D.N.Y. 2000), aff'd 2000 WL 420548 (S.D.N.Y. 2000). ("By comparing the timing of each company-specific event against the value line, [the expert] determined that there were no events other than the alleged fraud that affected Sloan's stock price during the Class Period.")



subjective analysis by their expert. While, as noted above, there may be some challenges faced by an event study in the case of an omission, the court in that case found plaintiffs' expert's subjective analysis even more problematic:¹⁴

Plaintiffs distinguish the cases cited above by once again drawing a distinction between inflation of a company's stock price and maintenance of that price, explaining that [plaintiffs' expert] intends to testify that defendants' omissions artificially maintained Nortel's stock price. In plaintiffs' view, an event study would be unhelpful under such an approach. However, if there is a distinction to be drawn, it favors treating an analysis like [plaintiff's expert's] with even greater scrutiny than that addressed in cases like *Goldkrantz*. It would be an odd rule to allow greater leeway to an expert's speculative and hypothetical analysis about what would have happened to a company's stock price if certain information had been disclosed than to an expert's analysis about what in fact happened to a company's stock price when certain representations were actually made.

The court in that case made an interesting point that can be combined with the *Hill v. Equitable Bank* discussion of materiality. Some information will be so clearly material or immaterial that a jury should be able to reach conclusion about materiality without the help of an expert. In situations where the degree of materiality is not so clear, the expert would essentially be telling the jury how reasonable people like the jurors reacted to or would have reacted to the information at an earlier point in time. One difficulty that jurors could have with such a task is that they presumably were not following the company as carefully as market participants were at the time. To put jurors in the position of a reasonable person at the relevant time period, information about the company and market conditions can be provided to the jury through fact and perhaps expert testimony on the relevant issues that do not reach a conclusion about materiality. One might argue that to go further and reach a conclusion about materiality, an expert should bring more to the table than simply the facts that would put the jurors in the same position as market participants at the time.

In such a situation, an event study provides statistical evidence about how the market actually did react to the information, something that the jury could not simply intuit. Similarly, as discussed in the next section, a content analysis of relevant documents may provide evidence about what information was reaching the market and evidence of how news providers were viewing the information. A subjective analysis of what is or is not material, on the other hand, adds little more to the underlying facts than the expert's own opinion about the materiality of those facts. Moreover, while analyses like event studies are replicable, are the subject of a large academic literature, and have knowable error rates, an expert's subjective claim that certain information is or is not material does not include such features.¹⁵

¹⁴*In re Northern Telecom Ltd. Securities Litigation* 116 F.Supp.2d 446 at 461. See also *Watkins v. Telsmith, Inc.*, 121 F.3d 984, 991 (5th Cir. 1997) ("[I]t seems exactly backwards that experts who purport to rely on general engineering principles and practical experience might escape screening by the district court simply by stating that their conclusions were not reached by any particular method or technique.") and Notes of Advisory Committee on Rules to Federal Rule of Evidence 702 ("The more subjective and controversial the expert's inquiry, the more likely the testimony should be excluded as unreliable.")

¹⁵This should not be taken as a statement that an expert should never claim that something is or is not material based on their knowledge and experience. Sometimes such a step may be necessary to parse a price movement. (For example, if there were three pieces of news and the expert argues that one piece of news was not material, then the expert can allocate the entire price movement, net of any market and industry effects, between the remaining two pieces of news.) Because such intermediate steps may yield ultimate conclusions that are relevant for a finder of fact, there may be times when an expert makes a decision about materiality that helps in reaching that final conclusion. The finder of fact, however, should then be free to reject or alter the final conclusion if it disagrees with the expert's earlier conclusion about materiality. What is not clear is why an expert should make a subjective conclusion about materiality if that is a final conclusion that the finder of fact could make as well.

Assessing Materiality Through a Quantitative Content Analysis

The social sciences contain extensive academic study of written and oral communications. In particular, there is a large literature about a family of techniques known as “content analysis.” These techniques are often broken down into two subfamilies, qualitative and quantitative content analysis. Qualitative content analysis is in many respects not that different from an expert’s use of her experience to help her judge the materiality of certain communications, though the generally controlling standards in the academic field of content analysis go beyond what most experts employ.¹⁶ As such, it embodies many of the same benefits and drawbacks as the subjective views of an expert.

Quantitative content analysis, in its most pure form, will contain no judgment calls or subjectivity other than those that can be explicitly stated in the description of how the analysis was performed. For example, one can define a study that counts the number of times that each of the two major parties’ presidential candidates’ names appear in a headline in the *New York Times* as a way of analyzing the total newspaper attention to the presidential race and the relative attention given to the two candidates. The analysis itself would then be completely objective, though, of course, there may be questions about the parameters of the study (e.g., should one look only at headlines, should one look only at the *New York Times*, and is the analysis that looks at names valid if one candidate is the incumbent and often referred to as the “president” in headlines?).¹⁷ One benefit of this form of analysis is that because the analysis itself is objective, it should be easier to determine whether there was an actual error in implementation. In addition, disputes over parameters can move beyond theoretical disputes, as opposing parties should be able to show the results of an alternative specification.¹⁸

As implied above, the basic building block of a quantitative content analysis is that the “frequency with which a symbol, idea, reference, or topic occurs in a stream of messages is taken to indicate the importance of, attention to, or emphasis on that symbol, idea, reference, or topic in the messages.”¹⁹ That is, the more important something is, the more likely it is that people will be talking about it.²⁰

¹⁶ For example, most qualitative content analyses studies employ two or more coders to classify each element of the material being examined. (E.g., two coders may each read each newspaper article in a sample and classify the tone as “conservative,” “liberal,” or “neutral.”) Various measures of the correlation between the classifications used by the coders for the same material have been created; these measures can be examined to see if the coders are producing similar results, in essence mirroring the *Daubert* criterion of determining the “known or potential error rate” for the analysis. If the error rate, or difference in opinion, is sufficiently high, the investigator may consider revising or expanding the instructions and/or training given to the coders to see if more consistent results can be achieved. The correlation can also be compared to the correlation one would expect if the category assignments were random to obtain an additional measure of the reliability of the coding. Additional rigor can be provided through such processes as pre-testing various search terms and procedures on a subset of the data, as well as a reconciliation process, either with the same coders or a tie-breaker, for instances where the coders disagreed in their initial categorization of material.

¹⁷ This concept, sometimes referred to as the “reference-class problem,” discussed in Ronald J. Allen and Michael S. Pardo, “The Problematic Value of Mathematical Models of Evidence,” *Journal of Legal Studies*, January 2007.

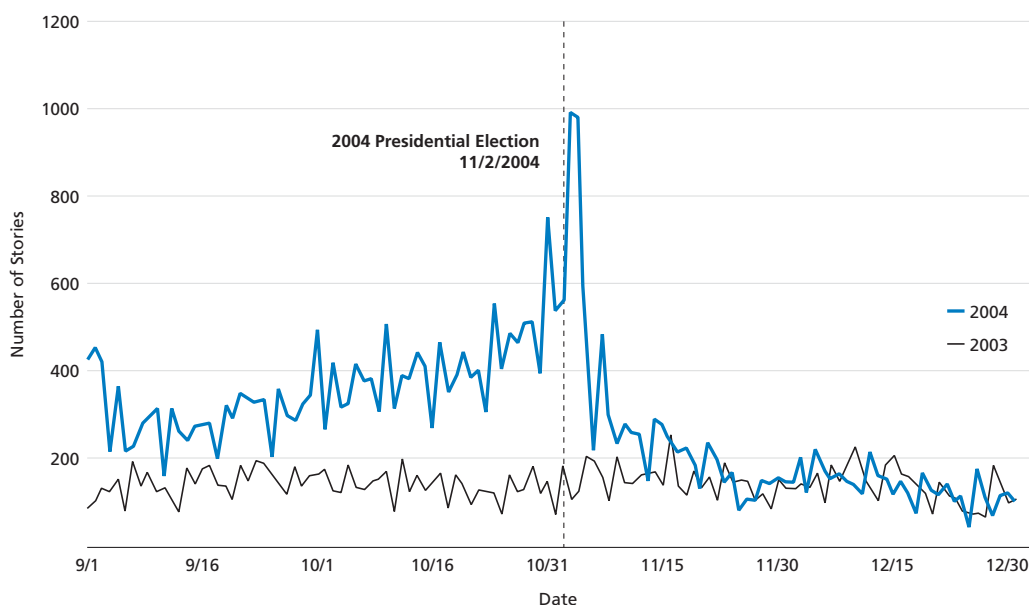
¹⁸ It should be noted that a quantitative content analysis can be set up so that there is still some subjectivity in implementation. For example, in the example above, the coders may have been told to count references to each candidate in newspaper headlines rather than be asked to look only for names. In that case, there may be some unanticipated ambiguities that arise (e.g., the headline “Campaign on a roll” referring to the campaign of one of the two candidates) in the process of coding.

¹⁹ Klaus Krippendorff, *Content Analysis: An Introduction to Its Methodology*, 2nd edition, 2004, p. 59. (Emphases in original.)

²⁰ A similar concept is found in academic analyses of the impact and worth intellectual property, in which counts or measures of patent citations are examined. See, for example, Hall, Bronwyn, Adam Jaffe, and Manuel Trajtenberg, “Market Value and Patent Citations,” *Rand Journal of Economics*, 2005. (“We explore the usefulness of patent citations as a measure of the ‘importance’ of a firm’s patents” and “The results of this paper clearly show that patent citations contain significant information on the market value of firms.”)

Comparison of Daily Counts for 2004 Presidential Election Stories

September 1 – December 31, 2003 vs. September 1 – December 31, 2004



A simple set of examples can help illustrate and provide additional comfort for this idea, in particular when considering news coverage of potentially material events.

The graph above shows a count of one measurement of the daily number of election-related news stories from the Major News and Business Publications fields in the Factiva news archival system for the months of September through December 2003 (shown in a black line) and for the same months in 2004 (shown in the thicker blue line).²¹

The results of this graph are not terribly surprising. From September through early or mid-November, there were more news stories matching the election news criteria in 2004 than in the same period in 2003. After the election, the two lines eventually fell into the same range. This confirms what one might reasonably expect: if one accepts that news coverage is a reasonable proxy for public interest and that 2003 is a reasonable baseline period, then the degree of public interest in the Bush-Kerry election, as measured through news stories, for the months of September through November 2004 was high, but there was no such materially high level of interest in December 2004.²²

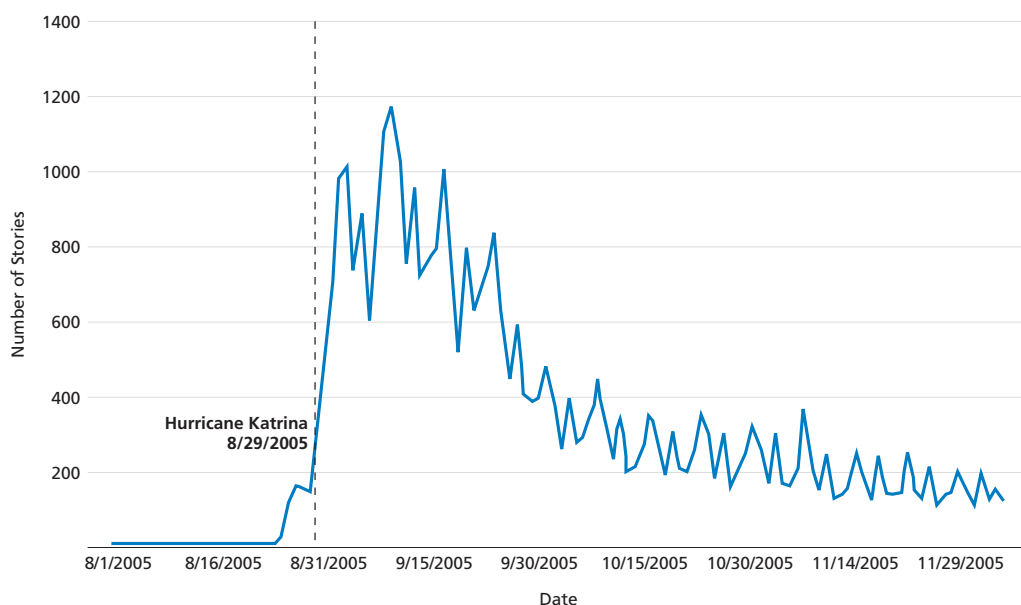
Though these results can be observed visually, we can also confirm statistically that the number of news stories meeting the stated criteria was higher in September 2004 than in September 2003, and similarly for October and November. On the other hand, there was no statistically meaningful difference between the number of stories in December 2004 compared to the number of stories in December 2003.

²¹ For purposes of this graph, election-related news stories were defined to be those that were selected using the following computerized search: "((Bush OR Kerry) AND (candida* OR elect*)) OR (Kerry and President*)," where an asterisk at the end of a word allows for any possible combination of additional characters (e.g., candida* would pick up candidate, candidacy, etc.) We also treat a mention in any news source identically and do not weight references in different news sources to try to account for the relative importance or prominence of different news sources.

²² One can also perform more refined analyses that break up the month of November or that use other story selection criteria.

Daily Count of Hurricane Katrina News Stories

August 1 – November 30, 2005



An additional example can be found by looking at counts of stories referring to “Hurricane Katrina” or “Tropical Storm Katrina” around the time it hit land on September 29, 2005. The exhibit above shows that stories using one of those terms appeared about a week before Katrina landed. The exhibit also shows, as with the presidential election, that attention to the storm, or its effects, grew in the lead-up to and immediate aftermath of the actual event. However, unlike the case of the presidential election, in which coverage at the end of the year was similar to the levels of the prior year and lower than in the lead-up to the election, coverage of Katrina was unsurprisingly higher in late 2005 than in late 2004,²³ and was at levels similar to those in the one or two days right before the storm hit.²⁴

There is some debate in the academic literature as to whether there is more to be said about the importance of different frequencies beyond the ordinal ranking. On the one hand, some scholars have implicitly claimed that there is a proportional relationship between mentions and importance, noting, “Finally, as with all content analysis, the assumption of importance of [an] information item being directly proportional to frequency of mention and other related issues may not be fully realistic.”²⁵ Most others, however, decline to take this view, instead relying on the less restrictive assumption “that higher relative counts (proportions, percentages, or ranks) reflect higher concern with the category” being counted.²⁶

²³ Not at all surprising, there were no stories mentioning Tropical Storm or Hurricane Katrina in the same time period in 2004.

²⁴ Of course, one should be careful with interpretation, as after the presidential election, coverage of its ultimate effects on government policy would generally no longer mention the losing candidate.

²⁵ Gaetan Breton and Richard J. Taffler, “Accounting information and analyst stock recommendation decisions: a content analysis approach,” *Accounting and Business Research*, Vol. 31, No. 2 (p. 100, internal citation omitted.)

²⁶ Robert Philip Weber, *Basic Content Analysis*, Second Edition, Sage University Paper (p. 56).



Quantitative content analysis has been used in finance, notably in the study of the information presented in analyst reports.²⁷ In terms of its application to securities litigation, one may encounter the question of what such a study shows. If the question is the prominence of certain information in a document, then a quantitative analysis is directly on point. If the question is the materiality or importance of the information *to the market*, then an additional assumption is necessary. For example, suppose that one were reviewing the content of analyst reports as a means of determining what issues were important to the market. An additional assumption may be that analysts are a proxy for the market, and, therefore, the information that they decide to include in their reports is likely to be the information that is material to the market. An additional, or perhaps an alternative, assumption may be that analysts attempt to achieve prominence in their field by presenting useful information to their readers. Thus, there is a form of market mechanism that encourages analysts to present information that is material to the market. That said, one must be careful to recognize that information that is generally assumed to be true or unlikely to be material may not feature prominently in analyst reports.²⁸



Content Analysis in Litigation

While a formal content analysis is generally not a staple in securities litigation, it has been used in other litigation settings.²⁹ Here we provide two examples of how quantitative content analysis can be used in securities litigation.

The materiality of revenues for a firm engaged in round-trip trading

There have been a number of cases of energy companies that were accused of engaging in “round-trip” trading, in which they sold a certain amount of energy to a counterparty and close in time also purchased the same amount of energy for the same price from the same counterparty. The principal allegation in these cases was often that if such transactions were included in financial statements or reported as trading volume, they artificially inflated the company’s revenues. Defendants would typically respond that because any improper recording of such transactions would have identical effects on revenues and costs, there would be no effect on either profits or cash flows. This leads to the question of whether revenue information was material to the market.

²⁷ See, for example, Gaetan Breton and Richard J. Taffler, “Accounting information and analyst stock recommendation decisions: a content analysis approach,” *Accounting and Business Research*, Vol. 31, No. 2; Gary John Previts, Robert J. Bricker, Thomas R. Robinson, and Stephen J. Young, “A Content Analysis of Sell-Side Financial Analyst Company Reports,” *Accounting Horizons*, Vol. 8 No. 2, June 1994; and Rodney K Rodgers and Julia Grant, “Content analysis of information cited in reports of sell-side financial analysts,” *Journal of Financial Statement Analysis*, Fall 1997, Vol. 3 Issue 1.

²⁸ For example, analysts are unlikely to report that a company is *not* under investigation by the SEC if there is no specific reason to believe that such an investigation is likely. This does not mean that an SEC investigation would not be material. For example, while a survey of news coverage around the 1989 Exxon Valdez oil spill shows no stories mentioning the ship before it ran aground, the dozens of daily news stories still available in the archives reveal that the event was widely covered after it occurred. Analyst reports, like the *news*, are more likely to report on *new* information or changes in information. Thus, one must be careful in claiming that previously omitted information was not material because it was not discussed in news before the omission was corrected.

²⁹ See, for example, *National Association for the Advancement of Colored People v. Acusport, Inc.* 271 F.Supp.2d 435 (EDNY, 2003) (An expert’s “opinions were largely based on a study that he performed using ‘content analysis.’ [The expert] and several of his research assistants reviewed documents and deposition testimony from the various defendants in an attempt to draw inferences as to which defendants did or did not employ any one of ‘countermarketing’ strategies [the expert] had identified. The results of this analysis were presented to the jury on charts that were useful and reliable in supporting his conclusions.”) (¶¶209–210.)

One standard approach to answering that question is to measure the company's abnormal stock price movements as a function of earnings and revenue surprises. Because, as discussed below, revenue forecasts are often not available, it may become necessary to proxy for earnings and revenue surprises by looking at changes in earnings and revenues. In addition to this statistical approach, an expert may wish to opine on whether the market was following the company's revenue data, meaning whether the market viewed revenues as material. As noted above, one way that the expert could try to do so is to simply claim, based on his or her experience and training, that the amount of allegedly misreported revenues either was or was not material given that earnings data were also provided. It is highly likely that a diligent search of news and analyst reports would even find a few quotes favoring each position.

What would be more helpful to the trier of fact, and would go beyond subjective opinion, is to perform a systematic content analysis on relevant news. To do this, we reviewed 235 analyst reports for one of the companies accused of recording revenues from round-trip trading,³⁰ and classified those reports into four categories: (1) those that provided earnings estimates but no revenue estimates; (2) those that provided revenue estimates but no earnings estimates; (3) those that provided both earnings and revenue estimates; and (4) those that provided neither earnings nor revenue estimates.³¹ Our results were as follows:

(1) Earnings estimates only	183 reports	77.9%
(2) Revenue estimates only	0 reports	0.0%
(3) Earnings and revenue estimates	23 reports	9.8%
(4) Neither earnings nor revenue estimates	29 reports	12.3%

Perhaps the most obvious feature of this analysis is that no analyst provided only revenue estimates; if an analyst was projecting the company's financial results, he or she always included earnings. Revenues were included in only 9.8% of the analyst forecasts, often because those forecasts included projections of detailed income statements for the company, which requires a projection of revenues, and not due to a focus on revenues. We also determined that each of the 23 analyst reports that provided both earnings and revenue estimates provided estimates of future price-to-earnings multiples on the first page of the report in a summary table of background statistics (such as the number of shares outstanding) and forecasts, while not a single one of those reports contained a similar estimate for a price-to-revenue multiple in that table.

Thus, while earnings forecasts were a major focus of analyst (and by proxy, market) concern, revenue forecasts were essentially only considered as part of the build-up to estimating future earnings. Put differently, analysts and, presumably, investors who read analyst reports show a consistent interest in projected earnings and projected earnings per share, but only at best a limited interest in projected revenues (without explicit indications of interest in revenue per share or interest in revenue without earnings and earnings per share).

To further test this conclusion, we examined the analyst report headlines. We found that 58 of the headlines made a reference to earnings (including terms such as "earnings" or "EPS") but only two mentioned sales or revenues. Furthermore, the sales references were not to trading revenues, but instead to gas sales or sales from another division of the company. Even when considering

³⁰ The sample consisted of all analyst reports in a given time period available from a data provider.

³¹ Note that this is very close to a purely objective set of criteria, though there can be some question if a revenue or earnings estimate can be backed out of other information in a report.

implied references to financial measures (e.g., “improved results”), a review of the text allowed us to conclude that over three-quarters of the implied references were to earnings, while the remainder could be referring to revenues or to both earnings and revenues.³² Consistent with the analysis of analyst estimates, there is strong evidence of analysts focusing on earnings, some evidence that revenues might be considered when paired with earnings, but no meaningful evidence that trading revenues were considered in the absence of earnings, further indicating that once the market knew about earnings, revenues became a superfluous and unused measure of firm value.

Components of a news disclosure

In another case, a company that made an announcement in which it disclosed two pieces of information: first, that it was lowering revenue estimates due to reduced sales from its largest customer (for patent-related reasons) and, second, that it was taking an impairment charge on certain equipment. The court dismissed the first part of the claim but allowed the case to proceed on a claim that the impairment charge should have been disclosed earlier. A standard event study showed that the stock price drop at the time of the announcement was statistically significant. However, because the two pieces of news were released simultaneously, it was not clear how much of the change in the stock price was due to the impairment.

We reviewed news stories on the day of and the day after the announcement. Specifically, we examined whether headlines and full-text stories included keywords related to the impairment charge (impair*, writedown, and charge, where the asterisk allows for words with alternative endings) and the change in revenue estimates (sales, revenue*, outlook, patent, and the name of the customer).³³ We found seven headlines and 42 full-text stories that included at least one of the revenue-related terms but no headlines and only 26 stories that included the impairment-related terms. Because a headline or story could use more than one term, we also counted the total number of times that the terms were used, finding 11 headline and 811 total usages of revenue-related terms and no headline and 105 total usages of impairment-related terms. These results allowed us to say that the impairment aspect of this announcement was less important (at least as measured by news coverage) than the revenue news. Assuming that the more important news story accounted for more of the price decline, we can conclude that the impairment aspect of the news accounted for less than half of the total price decline.

Quantification of the Price Impact of an Event

A quantitative content analysis may also be helpful, as a supplement to an event study, in estimating how much a piece of information affected the price of a security. As noted above, a simple event study measures the effect of all new information in the measurement period. Courts have regularly held that if the price movement measured includes the effect of both fraud-related and non-fraud-related information, the resulting measurement is not a reliable measure of damages. In response, and also because of their agreement with this view, most damages experts attempt to parse out the effects of these two types of information when both are present. However, unlike the case of the

³² For example, the classification of a reference to “results above expectations” would depend on whether the text of the report referred to earnings expectations, revenue expectations, or both. While some classifications could refer to earnings alone or earnings and revenues, we never found any headlines that appeared to refer only to revenues. Thus, this analysis may have some minor degree of subjectivity in deciding how such ambiguous headlines are handled.

³³ A review of the stories helped confirm that we did not appear to be missing any other terms commonly used in referring to either of these two parts of the announcement.

measurement of the overall price movement, there is no standard means of parsing. In fact, the data needed to do so may not be present in every case.

Experts have sometimes used purely subjective analyses to try to parse out the effects of fraud-related and non-fraud-related information on the price of a security. Except perhaps in the case where the expert concludes that one category of information is simply not material, this takes the degree of subjectivity in the analysis even further, with the expert opining that one component of the news accounted for, say, forty percent of the price movement.³⁴ At best, the expert opines that one of the components was “more material” than the other, meaning that the “more material” information accounted for at least fifty percent of the effect and the “less material” information accounted for at most fifty percent.

Rather than only provide ultimate conclusions, a quantitative content analysis can provide data from which the expert and/or the trier of fact can draw conclusions. For example, the expert may report that there were forty news headlines mentioning Statement X and twenty mentioning Statement Y after a disclosure containing those two pieces of information. Under the general assumption that the frequency with which a topic occurs is an indication of the importance of the topic, the expert or the trier of fact would have an objective basis for concluding that Statement X was more important than Statement Y. This would allow them to further conclude that Statement X accounted for a larger share of the observed price movement than did Statement Y. Of course, many will be tempted to also conclude that Statement X had a price effect twice as large as Statement Y. While such a conclusion is possible and does have some academic support, it relies on a stronger, and less commonly accepted, set of assumptions.³⁵

Conclusion

Current expert analyses about materiality in securities cases are often found at the extremes of a scale running from objective to subjective methodologies. On the one hand, event studies provide a well-defined analysis that can quantify and measure the statistical significance of price movements. On the other, subjective expert conclusions that are generally not replicable and lack rigorous controlling standards.

While it is unlikely that experts’ reading and internal analysis of information will not be useful in some cases, there are situations in which it should be possible to improve upon a wholly subjective assessment of materiality through tools such as quantitative content analysis. For example, in assessing the materiality and effects of new information, a quantitative content analysis can be set up in a replicable fashion, following stated controlling standards, that provides results with known statistical error rates. These results can be used to provide evidence for or against a claim of materiality, as appropriate, and to assess the relative importance of different pieces of information. There may be times when the expert would make those assessments about materiality, while at other times, the interpretation of the content analysis would still be subjective, but the results of the analysis, and then that ultimate assessment about materiality could be placed with the trier of fact.



³⁴This criticism does not apply to properly performed mathematical or statistical methods of parsing the effects of different categories of information.

³⁵An interesting question, beyond the scope of this paper, is whether the literature supporting this view, such as the Breton and Taffler paper cited in footnote 25, is sufficient to constitute a reasonably accepted methodology in the peer-reviewed literature upon which an expert can rely.

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